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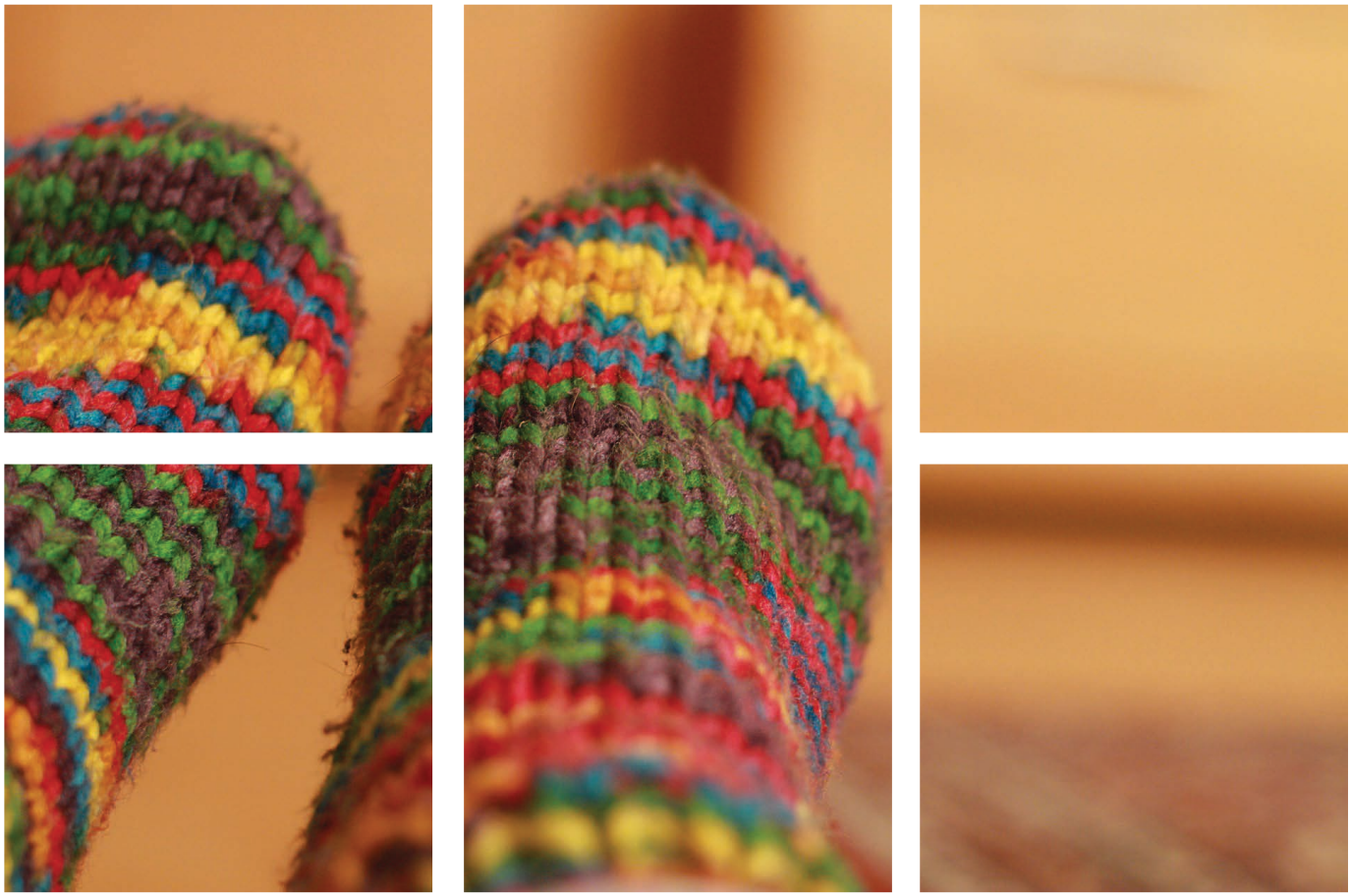
Heating unequally: understanding inequality in access to a warm home in real terms



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Key points

- There is stark inequality in terms of the amount of heating and hot water households in the UK can afford to use, with the highest consuming households accessing almost one month (27 days) more of heating and hot water than the lowest each year.
- London is the highest consuming region in relation to gas for heating and hot water, with average households in London accessing five and a half days more heating and hot water a year, compared to the lowest consuming region (the South West).
- But there are stark differences between the highest and lowest gas consumers in all regions. The difference is most pronounced in London, where the highest consuming households access 27 days more heating and hot water a year than the lowest consumers.
- We also identify inequalities between different housing tenures, with owner occupiers accessing up to eight days more heating and hot water a year than those in social housing.
- Between 2016 and 2019, the highest consuming households increased their gas consumption by 5.4 days, accessing almost one week of additional heating a year compared to pre-2016.
- Following the onset of the energy crisis, the highest consuming households then reduced their gas consumption by 4.2 days per year between 2021 and 2022 (almost back to pre-2016 levels). This is compared to a reduction of 1.4 days per year amongst the lowest consuming households. This suggests that that there is more scope for high consuming households to reduce consumption without significantly impacting their comfort, when prices are high. Low users find limited scope to cut back their usage further.
- In all regions, households in the highest consumption decile consume more than households in the lowest decile by at least an amount equivalent to the region's mean gas consumption.
- House size is a core determinant of levels of consumption with the largest properties (over 200 square meters), consuming almost one month's worth more heating each year than the smallest properties (under 50 square meters). Specifically, the difference is 570 hours or 24 days (17,100 kWh) per year.

Introduction

Three quarters of households in the UK rely on natural gas to fuel the central heating systems that heat their homes and warm their water (Office for National Statistics, 2023). Gas prices have become progressively more volatile over the last decade and particularly since the energy crisis of 2022, fuelled by geo-political unrest. However, some households can afford to use gas more abundantly than others. An inability to afford to heat the home to a comfortable level that allows for the maintenance of health and wellbeing, is called fuel poverty and this is a persistent and growing issue affecting around 6.1 million households in the UK currently (NEA, 2024). Inadequate access to warmth is known to increase vulnerability to social and economic exclusion, poor physical and mental health, low educational attainment and can also affect our ability to sustain employment (ibid).

The difference in annual gas consumption between the highest and the lowest consuming households in the UK is stark. This inequality is typically talked about in terms of the difference in kilowatt hours (kWh) consumed. Using the language of kWh makes it difficult to understand how much access to warmth and hot water households have in real terms. In other words, kWh tell us nothing of how many days and hours of heating and hot water a household can afford to access.

By calculating the hours that an average 30 kWh boiler is in use, we can estimate how many additional hours of heating and hot water the highest consuming households use compared to the lowest consumers, revealing the true extent of heating inequality in the UK. Calculations are based on an average boiler working at full capacity. However, it should be noted that boilers typically operate at approximately 70 per cent of their capacity when heating the home (Palmer & Cooper, 2013). It is therefore likely that the estimates we make within this report are conservative. Additionally, as numerous factors influence the level of warmth in a home, including energy efficiency and air tightness of the building, local climate, exposure to weather etc., high gas usage may not necessarily assure comfort. However, the more gas a household can afford to access, the more chance they have of accessing adequate warmth.

In this short report, we share the findings from our analysis of the extent of inequality in access to heating and hot water in the UK overall and by

region, and also by housing tenure and we express our findings in terms of days and weeks, as well as kWh. We hope that, in doing so, we aid a greater appreciation of the lived reality of inequality of access to heating and hot water, thus informing and hopefully galvanising action on this form of inequality.

Approach

This analysis uses the UK Government's gas consumption data for England and Wales to translate kWh of gas consumption into an hours and days equivalent. The data used to calculate national and regional figures was the 'Additional consumption data tables England and Wales (2022)' from the National Energy Efficiency Data-Framework (NEED). For Middle Layer Super Output Area calculations, the 'MSOA domestic gas 2010 to 2023' data was used.

To translate the consumption inequality between the highest and lowest consuming households and regions to a measure of hours and days, the difference in gas consumption (kWh) was divided by 30, with 30kWh being an average boiler size in the UK with most being between 24kWh and 35kWh. This provided the approximate additional hours of gas usage that the highest gas consumers have access to. This figure was then divided by 24 to provide the approximate number of full days of gas usage.

This approach has been adopted to provide a more meaningful language to discuss consumption inequality and highlight the potential differences between the lived experience of the highest and lowest consumers. However, the numbers of days and hours calculated could change up to 25% by using a higher or lower efficiency boiler rating (e.g. 24kWh/40kWh).

Variation in gas consumption between regions

There is a comparable level of annual gas consumption between six of the ten regions of the UK included in our analysis, with a maximum difference of 700 kWh between them, which equates to 23 hours more heating and hot water over the course of a year. However, there is an annual difference of 3,900 kWh ingas consumption between the highest consuming region (London), which uses an average of 16,100 kWh per annum, compared to the lowest consuming region, (South West), that uses 12,200 kwh per annum. This equates to the average London household consuming 130 hours of heating and hot water, or approximately five and a half days more than the average household in the South West.

There is also a significant difference between the amount of gas consumed by the highest consuming households (those in the top decile) in London and the highest consuming households in the rest of the country. For example: the highest consuming households in London consume 5,800 kWh per year more than the highest consuming households in the North West, which equates to an additional 193 hours or eight days of heating and hot water. In comparison, the difference between the region's lowest deciles is less pronounced, with just a under 2.5 days or 56.5 hours (1,700kWh) difference between East Midlands/East of England, and Wales.

We therefore see notable inequality in access to heating and hot water between regions of the UK, with London households having the most abundant use, despite a milder climate than many areas of the UK. It is also revealed that significant inequality also exists between the highest consuming households within different regions of the UK, with our analysis revealing a stark difference (193 hours/eight days per year) in consumption between London and the North West, to pick the most extreme example.

However, stark inequalities also exist within regions. London exhibits the highest levels of intra-regional inequality, with a difference of 19,200 kWh per annum between the highest and the lowest consumption deciles. This equates to an additional 640 hours of heating and hot water a year, or nearly 27 additional days extra for the highest consuming households. The region with the next highest consumption inequality is the South East, which has a gas consumption difference of 543 additional hours or 22.6 additional days (16,300 kWh).

Middle Super Output Area (MSOA) gas consumption data for South Yorkshire (a region that exhibits high levels of inequality (Beatty et al., 2023)), reveals that the difference between the highest and the lowest consuming MSOA's is 10,709 kWh per annum. This equates to an additional 350 hours of heating and hot water a year, or 14.5 additional days for the highest consuming households. This regional analysis demonstrates that consumption inequality is present at multiple spatial scales.

Gas consumption inequality between the highest and lowest consuming households

The differences in annual gas consumption between the households in the highest and lowest consumption deciles are dramatic. Nationally, households in the highest consuming decile consume 523 hours, or 22 days, more gas that the lowest consuming decile. In all regions, households in the highest consumption decile consume more than households in the lowest decile by at least an amount equivalent to the region's mean gas consumption. For example, in the South West, the region with the lowest inequality, there is a difference of 12,200 kWh, which equates to 456 hours (19 days) additional hours of heating and hot water for the highest decile of consumers, whilst the region's mean gas consumption is only 9600kWh (320 hours/13.3days). In the region with the greatest consumption inequality, the highest consumers in the region access an additional 19,200kWh of gas which equates to an additional 640 hours (26.5 days) of heating and hot water and is significantly more than the regions mean gas use of 12,200kWh (406.6 hours/16.9 days). House size is a core determinant of levels of consumption with the largest properties (over 200 square meters), consuming 570 hours or 24 days (17,100 kWh) more than the smallest properties that are under 50 square meters. Tenure also impacts gas consumption with owner occupiers having the highest consumption and social housing, the lowest. Owner occupied homes access between 183 hours (eight days) and 103 hours (four days) more gas than those in social housing.

The National Energy Efficiency Database (NEED) report (DEZNZ, 2024) report reveals an overall reduction of gas consumption from 2021 to 2022 (coinciding with the energy crisis), which is also reflected in our analysis. The level of consumption reduction during that period was greater amongst the highest earning households, whose gas consumption reduction was three times that of the lowest (3000kwh and 1000kwh respectively). This equates to an annual reduction of 100 hours/4.2 days for the highest consuming households compared to a reduction of 33.5 hours/1.4 days for the lowest consuming households. This suggests that the highest consuming households have the greatest scope to reduce their gas consumption in response to economic pressure. There is less scope for the lowest consuming households to reduce their consumption significantly from an already low base, but our analysis suggests that they are still reducing consumption in response to economic pressure.

However, when comparing reduction levels amongst these two groups over a longer period, a steady reduction in gas consumption is witnessed overall, whereas the higher income group sees greater fluctuation in gas usage. In the years between 2016 and 2019, the gas usage of those in the highest income bracket increased by 3,900kwh which is an increase of 130 hours or nearly 5.5 days, before reducing by 6600kwh in 2022 which is a reduction of 220 hours or over nine full days.

Conclusions

By translating kWh usage of gas consumption into everyday language that better reflects lived experience, the impact of consumption inequality can be better understood. Stark inequality is witnessed across all spatial scales, with under-consuming households not being able to meet basic warmth and comfort needs, whilst the highest consumers use significantly higher levels that can be reduced when needed, for example in response to financial price fluctuations.

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